Instructor

Dr. Narayanaraj
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Email: gnraj@umich.edu

Scheduled Meeting

Lectures:
Tuesdays: 10:00am – 12:00noon (1046 Dana)

Discussions:
Thursday: 10:00am – 12:00noon (3325 Dana)

Office Hours:
TBA

Course Synopsis

This course aims to teach the student to learn the fundamentals in Fire Ecology through lectures, student-led discussions, and field/laboratory exercises. Through the course, students will learn to understand the fire relationships to vegetation, climate, topography, people, and their changing physical and social environments. In particular, we will cover the following topics: The geological history of fire, Pyrogeography (temporal and spatial patterns of fire), Fire and plants, Fire and animals, Anthropogenic fire, Fire and public health, Fire and climate, Fire as an ecosystem process, Fire as a physical process, Fire and anthropogenic environmental change, and Forest fire policy and analysis.

Course Format: Students will spend the first part of each class in lecture and the second part in student-led paper discussion. At the end of the semester, students are required to write a synthesis paper on their own chosen fire-related topic along with a 20 minute presentation on their paper.

Learning Outcomes:

By the end of the course it is expected that students will be able to understand:

- Principles of fire ecology.
- Physical and biological processes influence on when, where, and how fires burn across the landscape.
- Wildfire impact on organisms, communities, and landscapes.
• Scientific understanding of wildland fire/disturbance ecology to inform land management policies and practices.
• Wildfire role in an ecosystem over different spatial and temporal scales.
• Human impact on land and fire regime
• Fire weather and climate

**Required Readings**

Selected academic journal papers, professional reports, and authoritative websites will be posted to CANVAS.


**Grading**

Grading will be on a straight, rather than curve, scale. The scale is:

- A = 95 -100
- A- = 90-94
- B+ = 87-89
- B = 83-86
- B- = 80-82
- C+ = 77-79
- C = 73-76
- C- = 70-72
- D+ = 67-69
- D = 63-66
- D- = 60-62
- Unsatisfactory = < 60

Your final grade will be based on the following assignments:

- Final Project: 30%
- Student-led discussions (2 leads): 30%
- Quizzes: 30%
- Participation: 10%

*Note*: There are no make-up assignments, discussions and in class activities. Extraordinary cases will be handled on a case-by-case basis.

**Final Project**

Students are expected to give a 20minutes oral presentation and a written report about their individual wildland fire research projects. *A more detailed handout will be provided later.*

**Student-led discussions**

Each week a group of two (depending on class size) of students will generate a set of questions based on the readings and lead a class discussion for the first half hour of class. The student presenters need to meet with me at least five days prior to the class facilitation to review the questions. At that meeting, the student presenters need to have completed the reading and drafted discussion questions (usually about ten questions – even though we might not get to each question, it is important to have some in reserve).

In other words, you need to complete your reading early when you are presenting. When you lead the class discussion, you need to provide hard copies of your questions for each class...
participant. Each student must facilitate class discussions twice during the semester. Everyone will sign up for discussion dates at the beginning of the term.

*Important note:* I expect every student to contribute to the discussions. I am aware that some people like to talk while others are quiet by nature. Therefore, it is important for people who like to talk to pause and encourage others to speak. At the same time, it is equally important for those who do not like to talk to put some extra effort into contributing to discussions. Both leading and participating in discussions are equally important and are counted toward your grade.

**Quizzes**

There will be a quiz on every other Tuesday throughout the semester starting with the third Tuesday of the semester. The quizzes will focus on recent material covered in class.

**Field/Class Activities**

Free Writing, Think-Pair-Share, and Entry & Exit tickets exercises will be used both in the field and classroom.

**Attendance**

Our class size and structure requires student attendance each week. In the unlikely event that you need to miss class (such as family emergencies or professional development opportunities), please let me know in advance so we can accommodate the situation. Missed class will be calculated against the participation grade and/or field/class activities assigned for that day.

**Academic Integrity**

Students are expected to be honest and ethical in their academic work. Zero credit will be given for any assignments involving acts of dishonesty, additional acts can result in an F for the entire class. For more information about academic integrity and the University’s policies and procedures in this area, please visit the Student Conduct web site at: [http://www.rackham.umich.edu/current-students/policies/academic-policies/section11](http://www.rackham.umich.edu/current-students/policies/academic-policies/section11)

**Classroom Etiquette**

Mobile device such as cell phones must be **turned off and placed out of sight and remain there the entire class.** If you must keep one on because of an emergency, please inform me beforehand.

Computers may be used to take lecture notes, to aid discussion of papers, and during exercises. However, absolutely no web surfing or emailing are allowed during class. **Be on time!** I expect everyone to be on time for class in order to not disturb the lecture. If for some reason you are late, I ask that you be extremely quiet and not disturb anyone as you enter and sit down. Do not leave the class early. If you have a special reason for leaving early please contact me before class begins and sit close to the door in order to exit quietly.

**Students w/ Special Challenges**

If you believe that you need accommodations for a disability, please contact the Services for Students with Disabilities (SSD) office at 734 – 763 - 3000 or email: ssdoffice@umich.edu to arrange an appointment to discuss your needs.

As appropriate, SSD office will issue students with documented disabilities a formal...
Accommodations Letter. Since accommodations require early planning and are not retroactive, please contact the office as soon as possible. For details about the accommodations process, visit the SSD office Website at https://ssd.umich.edu/. You are also welcome to contact me privately to discuss your academic needs as early as possible, no later than the second week of the semester. However, all disability-related accommodations must be arranged through the SSD office.

Class Schedule
We will spend Tuesdays (10:00-12:00noon) of each class on lecture. The Thursdays (10:00 - 12:00noon) of each class we will devote to student-led discussions. Students are required to attend all of the lecture, discussion and field activities each week.

Course Schedule Disclaimer: The Course schedule will be followed as closely as possible. However, unpredictable events and slow progress in mastering the materials taught in class or a rapid progress in catching up to the instructor may cause changes in the original schedule.

Below is the class schedule (tentative) for spring, 2018. The topics will be lectures, demos, discussions, field activities and/or laboratory exercises.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Subject</th>
<th>Readings</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>02 January</td>
<td>COURSE INSTRUCTION: Syllabus</td>
<td>Chapter 1. 1-1.4*</td>
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<td></td>
<td>04 January</td>
<td>Overview wildfire basics and disturbance ecology</td>
<td>Chapter 9*</td>
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<tr>
<td></td>
<td>09 January</td>
<td>INTRODUCTION TO FIRE IN THE EARTH SYSTEM:</td>
<td>Bowman et al. 2009 Pyne et al. 1996 (Pages 3-24)</td>
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<td>2</td>
<td>16 January</td>
<td>WILDFIRE ENVIRONMENT: What is required for wildfire?</td>
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<td></td>
<td>18 January</td>
<td>TOPOGRAPHY: How topography can influence fire ignition, intensity, direction, and the rate or speed</td>
<td>McKenzie et al. 2003 Running 2006 Westerling et al. 2006</td>
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<td></td>
<td>23 January</td>
<td>Student-led discussions-1</td>
<td>TBA</td>
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<tr>
<th>Week</th>
<th>Date</th>
<th>Activity</th>
<th>Reading Material</th>
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<tr>
<td></td>
<td>01 February</td>
<td>Student-led discussions-3</td>
<td>TBA</td>
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<tr>
<td>6</td>
<td>06 February</td>
<td>WILDFIRE BEHAVIOR: Characteristics of fire behavior in relation to topography, weather, climate and fuel.</td>
<td>Chapter 14*&lt;br&gt;Cochrane et al. 1999&lt;br&gt;Ryan 2002</td>
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<td></td>
<td>08 February</td>
<td>Student-led discussions-3</td>
<td>TBA</td>
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<td></td>
<td>15 February</td>
<td>Student-led discussions-5</td>
<td>TBA</td>
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<td>7</td>
<td>20 February</td>
<td>WILDFIRE AND PLANTS: Plant strategies to tolerate fire</td>
<td>Chapter 7*&lt;br&gt;Ryan et al. 1994&lt;br&gt;Bond et al. 2005</td>
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<td>22 February</td>
<td>Student-led discussions-6</td>
<td>TBA</td>
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<tr>
<td>8</td>
<td>06 March</td>
<td>WILDFIRE AND FAUNA: Wildfire’s influence on wildlife and it habitat.</td>
<td>Chapter 8*&lt;br&gt;McCullough et.al 1998&lt;br&gt;TBA</td>
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<td></td>
<td>08 March</td>
<td>Final Project planning</td>
<td>EXPLORING GEOSPATIAL DATA: MTBS and LANDFIRE (see the handout)</td>
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<td>9</td>
<td>13 March</td>
<td>TEMPORAL AND SPATIAL PATTERNS OF WILD FIRE: When and where clustering of fire events, spread of fire, and severity of fire occurs on the landscape.</td>
<td>Chapter 6 *&lt;br&gt;Narayanaraj, Wimberly 2011</td>
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<td></td>
<td>15 March</td>
<td>Student-led discussions-7</td>
<td>Meldler, J.M 2010.</td>
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<td>10</td>
<td>20 March</td>
<td>WILDFIRE AND PEOPLE: Fire and anthropogenic environmental change</td>
<td>Chapter 10*&lt;br&gt;Narayanaraj &amp; Wimberly 2012</td>
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<td></td>
<td>22 March</td>
<td>Work on final project</td>
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**Spring Break**

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<tr>
<th>Date</th>
<th>Month</th>
<th>Topic</th>
<th>References</th>
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<tr>
<td></td>
<td>29 March</td>
<td>Student-led discussions</td>
<td>TBA</td>
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<tr>
<td>13</td>
<td>03 April</td>
<td>WILDFIRE &amp; INVASIVE SPECIES: What’s the link between fire and plant invasion?</td>
<td>Meigs et al. 2016 TBA</td>
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<td></td>
<td>05 April</td>
<td>Student-led discussions</td>
<td>TBA</td>
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<td>14 &amp; 15</td>
<td>10 April</td>
<td>WILDFIRE AND PUBLIC HEALTH: Characteristics and composition of wildfire smoke influence on public health</td>
<td>Bowman &amp; Johnston 2005 Kim et al. 2015 TBA `</td>
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<tr>
<td>13 &amp; 18</td>
<td>April</td>
<td>Presentations</td>
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READINGS (Subject to change):


Week-1


Week-2


Week-3


Week-4


Week-5


Week-6


Week-7


Week-8


Week-9


Week-10


Week-11


Week-12


Week-13

TBA

Week-14